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MISCELLANEOUS REPORT NO. 11

FORESTRY IN NORTH DAKOTA

By E. L. Demmon, Director

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Lake States Forest Experiment Station

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FORESTRY IN NORTH DAKOTA [1]

By E. L. Demmon, Director
Lake States Forest Experiment Station [2]

North Dakota is generally considered a state with very little forest growth. Actually, the natural woodlands of North Dakota covered some 700,000 acres when the first settlers arrived. North Dakota people since earliest settlement have been interested in growing trees and have planted hundreds of thousands of small trees in groves and windbreaks. It is not surprising, therefore, that the North Dakota Tree Farm program launched last November has met with such widespread interest and approval. It is noteworthy that North Dakota was the first state to certify shelter belts under the American Tree Farm System.

It is estimated that the present commercial forest area in North Dakota covers about 470,000 acres and includes 434 million feet of saw timber, mostly cottonwood and aspen. Noncommercial forest may cover an additional 150,000 acres. Approximately 90 percent of the forest land area is owned by private individuals, the balance being in public ownership. The natural timbered areas are concentrated in the Turtle and Kildeer Mountains, the Pembina Hills, the Devils Lake area, and along the bottom lands of the Missouri, Red, and Sheyenne Rivers and their tributaries. These woodlands have served to provide a small part of the local needs for lumber,[3] fuel wood, fence posts, and railroad ties. If carefully protected and managed, their growth could be greatly improved in both quality and quantity. However, major forestry emphasis in the future must be placed on shelter-belt and windbreak planting.

No systematic survey has yet been made to ascertain the exact acreage of different kinds of forest, its current and potential growth, and what is happening to it in the way of cutting, burning, or other losses. The Lake States Forest Experiment Station has been authorized to work with State authorities on such a survey and hopes to be able to initiate it within the next few years.

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[1] Address given at the North Dakota Prairie Tree Farm System dedication at Fessenden, North Dakota, June 29, 1950.

[2] Maintained by the U. S. Department of Agriculture, Forest Service, in cooperation with the University of Minnesota, University Farm, St. Paul, Minnesota.

[3] Census figures for 1947 showed 13 active sawmills in North Dakota, with a total cut for the year of 627,000 feet of lumber (614,000 feet cottonwood and aspen, 10,000 feet basswood, and 3,000 feet oak).

The native woodlands of North Dakota are almost entirely broadleaved species -- cottonwood, boxelder, green ash, paper birch, aspen, bur oak, American elm, hackberry, basswood, and several species of willow and poplar. Ponderosa pine grows in scattered stands throughout the Bad Land area south and west of the Missouri River, the heaviest concentration being in Slope County. Also, redcedar grows sparsely on some of the bluff lands in the western part of the state.

Many tree species have been tried since plantings were first begun following the Timber Culture Act of 1873 (repealed in 1891). These early plantings were made, however, without much background of experience in how to prepare the land, what species of trees to use, and how to care for the plantings. As a result, many of them failed. Principal species used in the early plantings included boxelder, cottonwood, green ash, and various willows.

Soon after it became a state in 1889, legislation was enacted by North Dakota to encourage forest planting by offering bounties. In 1891 it created the office of State Superintendent of Irrigation and Forestry, partly to promote tree culture throughout the state. As early as 1897 the North Dakota legislature established a School of Forestry, although this school did not become a reality until 1907, when a building was constructed at Bottineau. After being closed from 1923 to 1925, the school was reorganized in 1925 and since then has served as a junior college, offering a 2-year preforestry course. The head of the School of Forestry is also the State Forester. A 2-year preforestry course is also given at the North Dakota Agricultural College at Fargo.

Cooperation under the federal Clarke-McNary Act began in 1925 with the appointment of a State Extension Forester. At the same time the State Forest Nursery originally established in 1913 at Bottineau was expanded. Planting stock has been grown and distributed to farmers in every county in the state.

In addition to the State Extension Forester, whose headquarters are at Fargo, a farm forester has been giving woodland management assistance to timber land owners in the Turtle Mountain area since 1940. He has been employed under the Norris-Doxey Act, working in close cooperation with the State Forester. From 1940 to 1944 he was assigned from the Soil Conservation Service and from 1945 to 1948 by the Forest Service. Since 1949 the farm forester has been employed directly by the State, but financed partly from federal funds.

The U. S. Department of Agriculture, in establishing the Northern Great Plains Field Station at Mandan in 1912, aimed to work out the possibilities of growing trees in the drier part of the state west of the 100th meridian to provide shelter to farm buildings, orchards, and gardens from damaging winds and drifting snow. The results of this station's program, carried out on a cooperative basis with farmers, has been instrumental in determining the species of trees best adapted to the region and in establishing demonstration shelter belts throughout the western part of the state, as well as in portions of South Dakota, Montana, and Wyoming.

The Shelter Belt or Prairie States Forestry Project was set up in July 1934 under the direction of the U. S. Forest Service to aid the drought-stricken states from Texas to the Canadian border. Its chief purposes were, through tree planting, to ameliorate drought conditions, protect crops and livestock, reduce dust storms, and provide useful employment. From the first plantings in 1935 until its activities under the Forest Service were closed out in 1942, it helped to establish 36,000 acres of shelter belts in North Dakota. These plantings accounted for 2,556 miles of successful belts, situated on 3,827 farms, with a total of 36,350,540 trees planted (26,901,047 new plantings; 11,178,965 replacements). Practically all the labor used came from relief rolls. After 1942, the Soil Conservation Service and State agencies continued to stimulate shelter belt planting. Private nurseries have also played an important role in growing nursery stock for shelter-belt and windbreak plantings throughout the state. It is estimated that the total area of forest plantings in the state may have covered approximately 200,000 acres up to the present time. In a study of postwar agriculture made in 1944, the North Dakota Agricultural Advisory Council estimated that the planting needs for shelter-belts, windbreaks, etc., in the state totaled about 730,000 acres. To reach this goal in a reasonable time, there must be considerable expansion in the production of nursery stock by all agencies.

A preliminary study of the survival and growth of shelter belts started by the Prairie States Forestry Project during 1935 to 1938 was made by Munns and Stoeckeler in 1944. Their random sampling included an examination of 203 belts in North Dakota. The condition of these belts rated as follows: good or better - 75 percent; fair to poor - 21 percent; and destroyed - 4 percent. In North Dakota, belts rating good to excellent were found on the four general areas sampled as follows: Red River Valley - 92 percent; Devils Lake - 59 percent; Valley City - 77 percent; and Towner - 72 percent. Tree survival was generally good. At an average of 7 years of age, belts in North Dakota averaged 16 feet high, which of course varied for different tree species, the highest being cottonwood and the lowest, conifers.

The Lake States Forest Experiment Station, established in 1923, includes North Dakota in its territory. It was not until 1929 that research on forestry problems in North Dakota received much attention. In that year a preliminary survey was made of the need for forest research, particularly in the sand-hill area in McHenry County. As a result of that survey and the interest taken by Senator Nye in the problem, $15,000 was made available to the Lake States Station on July 1, 1931, to set up a substation in the sand-hill region for studies of windbreaks and erosion control plantings.

An area near Denbigh (Section 36, T. 156 N., R 78 W.) was selected as suitable for these studies. This state-owned land was made available to the Station for forest research purposes in cooperation with the North Dakota State School of Forestry. Forty acres were deeded to the Federal Government as a headquarters site. Work got under way immediately and continued actively until reductions in funds made it necessary to place the project on a strictly maintenance basis in 1942. Since then a local caretaker has looked after the plantations and buildings, and Station personnel have checked tree survival and growth annually.

Following an initial planting of 5 acres in 1931, additional plantings were made each year thereafter until 1940, by which time 270 acres of experimental plantations had been established. In all, more than 40 tree species have been tested, more than half of them conifers. Native American species have been used mostly, but some from Europe and Asia have also been tried. On the drier dunes, the only species to grow satisfactorily are ponderosa pine, Rocky Mountain juniper, eastern redcedar, jack pine, and Scotch pine. On the slightly moister and more fertile sand plains, these same species are the best of the conifers, but Siberian larch and tamarack show some promise; western white spruce and blue spruce have done fairly well between nurse-rows of faster growing hardwoods. Cottonwood, green ash, and boxelder, are the best of the hardwoods. Bur oak survives well, but grows very slowly. Siberian elm (commonly called Chinese elm) survives well but freezes back frequently. Its only value is as a nurse crop. For all these species, it is important to get the right source of seed.

The first plantings were made in furrows, as had been done in the Nebraska sand hills. It soon became apparent that not enough relief from sod competition was provided by furrows. Hand-weeding and cultivation were then tried, and plowed strips used. Cultivation using a small tractor and shovel cultivator was also tried. Finally it became evident that in the sand-plains region the ground must be well prepared before planting. For at least five years after planting, three or four cultivations a year are needed to keep down competing grass and weeds. In the dunes, mechanical ground preparation and cultivation are impractical. Better establishment is obtained there by shading planted trees with brush. Of course, protection from fire is necessary, as well as from rabbits, insects, and other enemies.

The original plan for the Denbigh work was to carry out initial experiments on Section 36 and then to expand the findings on a pilot-plant scale on an experimental forest covering six or eight surrounding sections. These results, in turn, would be applied on national forests to be established on the sand plains. Some preliminary action was taken in this regard: (1) The State Legislature passed enabling legislation in 1933; (2) the National Forest Reservation Commission in 1935 approved the purchase of a 200,000-acre unit in McHenry, Bottineau, and Pierce Counties, and a 60,000-acre unit in Ranson and Richland Counties; (3) the U. S. Forest Service established a 480-acre forest nursery at Towner. Because of difficulties and low priority for such land purchase, however, these units were never established.

By 1937, the findings of the Station indicated that it was neither advisable nor feasible to go ahead with the original plan of planting large solid blocks of sand-hill land to trees. The reason for this was the relatively high value of the land for grazing, and the high cost of successful planting. The most logical plan for planting on the sand hills now seems to be to plant trees on the open dunes and in strips on about 10 percent of the area and provide adequate protection from grazing. The esthetic and recreational value of tree growth in the Plains, even more than the value of wood products, is a major justification for such a plan.

In addition to the main planting studies, Station personnel carried on nursery experiments at Denbigh, Bottineau, Towner, and Oakes; sand-blow plantings were made in several localities; shelter-belt effects on wind movement, snow drifting, soil moisture, rate of evaporation, crop yields, and savings in house-heating were studied; and grassland succession and water levels were recorded. The Station also conducted a study of the survival of old shelter belts which was reported in "Causes of Decadence in Old Groves of North Dakota," published as USDA Circular in 1935.

The forest research already started in North Dakota has yielded promising results. The Denbigh project might well be continued under a Plains States Forest and Range Experiment Station. Such a Station was authorized by the McSweeney-McNary Forest Research Act of 1928 and although the Forest Service has on several occasions recommended its establishment, no funds have been made available for this purpose. North Dakota and the other Plains States to the south contain millions of acres of range and forest lands, mostly in farm ownership, and of great importance to the economy of the region. Although considerable information is available on windbreak and shelter-belt planting, much additional research is justified -- to find the best kind of trees, the best locations for them, and better and cheaper methods of establishing them and maintaining their effectiveness for field and crop protection. There is also much to be learned about planting methods, tests of new species and strains suitable to the Plains, and determination of how and under what conditions of soil and climate trees can be most successfully grown.

Owners of North Dakota farm woodlands also need more information on woods-management practices that will be suited to conditions found in the state. Overcutting, promiscuous burning, and lack of care have already seriously depleted the present forested area. Research in the care and management of North Dakota woodlands should go hand in hand with shelter-belt research. There is also need for a survey of present woodlands and shelter belts to determine their extent and development, and to serve as a guide to future plans for planting, protection, and management.

Much remains to be learned about the value of windbreaks to offer protection to cattle and sheep on the western range lands. The severe blizzards of the winter of 1948-1949 caused millions of dollars damage to the livestock industry. Reports from representatives of the livestock industry indicate that much of this loss could have been avoided by windbreaks specifically planted to offer maximum protection to livestock on the open range. That same winter blizzards caused an almost complete paralysis of transportation in the Great Plains, including both railroads and highways. Here again a properly designed and located gridwork of tree belts could have reduced the length of time of the tie-up in transportation.

Tree consciousness is probably more widespread and intense in North Dakota and the other Plains States than anywhere else in the country. Since the earliest days of settlement and despite many failures and discouragements, farmers have persisted in efforts to grow trees to shelter their buildings and livestock, improve their surroundings, and protect their fields from blowing and drying. In recent months, the Tree Farm Program has made excellent progress in stimulating additional shelter-belt planting in North Dakota. The sponsors of this program are to be congratulated on this worthwhile activity. It should result in greater prosperity and security for the people of this great commonwealth.

Bibliography

(1) Anthony, James H.
1936. Preliminary report of forest conditions in North Dakota. 14 pp. Mimeo.

(2) Bates, Carlos G.
1945. Shelterbelt influences. I. General description of studies made. II. The value of shelterbelts in house heating. Jour. Forestry 43(2): 88-92; 43(3): 176-196.

(3) Bates, C. G., and Stoeckeler, J. H.
1942. Planting to control drifts on highways. Engineering News Record 129(23): 70-74, illus. Also mimeographed by the Station on December 1, 1941.

(4) Engstrom, H. E., and Stoeckeler, J. H.
1941. Nursery practice for trees and shrubs suitable for planting on the Prairie-Plains. USDA Misc. Publ. 434. 159 pp.

(5) George, Ernest J.
1936. Growth and survival of deciduous trees in shelter-belt experiments at Mandan, North Dakota, 1915-34. USDA Tech. Bull. No. 496, 48 pp.

(6) Gillett, Chas. A.
1927. Forests and forestry in North Dakota. Jour. Forestry 25(1): 38-43.

(7) Munns, E. N., and Stoeckeler, Jos. H.
1946. How are the Great Plains shelterbelts? Jour. Forestry 44(4): 247-257.

(8) North Dakota Agricultural Advisory Council
1944. Preliminary report on postwar agriculture in North Dakota. 100 pp., mimeo.

(9) North Dakota Department of Irrigation and Forestry.
1892-1900. Annual reports of the State Superintendent of Irrigation and Forestry, 1-8 (1891-1899). Bismarck and Jamestown, N.D.

(10) Scholz, Harold F.
1935. Causes of decadence in the old groves of North Dakota. USDA Circ. No. 344, 37 pp.

(11) Stoeckeler, J. H., and Kluender, W. A.
1938. The hydraulic method of excavating the root systems of plants. Ecology 19(3): 355-369.

(12) ________________ and Dortignac, E. J.
1941. Snowdrifts as a factor in growth and longevity of shelterbelts in the Great Plains. Ecology 22(2): 117-124, illus.

(13) ________________ and Williams, Ross A.
1949. Windbreaks and shelterbelts. Yearbook of Agriculture. 1949: 191-199.

(14) U. S. Forest Service, Lake States Forest Experiment Station.
1935. Possibilities of shelterbelt planting in the Plains region. Washington, D. C., 201 pp.

(15) U. S. Forest Service, Prairie States Forestry Project.
1938. Tree Planting on the Prairie States forestry project. Washington, D. C. 8 pp.

(16) Wilson, Robert, and Cobb, F. E.
1923. Development of cooperative shelterbelt demonstrations on the northern Great Plains. USDA Bull. No. 1113, 27 pp.

(17) Wilson, Robert (Revised by George, Ernest J.)
1937. Planting and care of shelterbelts on the northern Great Plains. USDA Farmers Bull. No. 1603, 24 pp.

(18) Zaylskie, John J.
1947. Trees and shrubs for eastern (and western) North Dakota windbreaks. No. Dak. Agr. Coll. and USDA (Cooperating) Circ. A-122, A-123, 4-page leaflets.

(19) Molberg, John M.
1950. Common trees and shrubs of North Dakota. North Dakota School of Forestry, 31 pp., illus.